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Applicant LEVIN, Moshe et al	

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18 October 2000 (18.10.00)

[ ] in a notice effecting later election filed with the International Bureau on:

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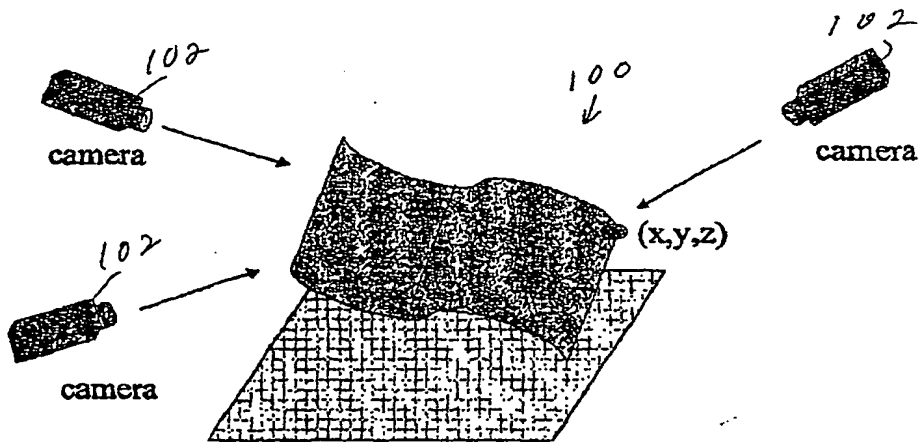

(57) Abstract

The positions and angular orientations of cameras used to cover a predetermined volume such as a hall or sports field are optimized by a combination of a genetic algorithm and a simulated annealing algorithm. In the genetic algorithm, first, random initial solutions are generated. A local search is performed around each of the random initial solutions to find a locally optimized solution. A random mutation is applied to each of the locally optimized solutions to obtain a mutated solution. The mutated solutions are recombined to obtain recombined solutions, which are sorted by coverage level. The recombined solutions having the highest coverage levels are selected for the simulated annealing algorithm. The simulated annealing algorithm begins by randomly generating a new solution which is separated from the recombined solution by less than a predetermined search radius. A coverage level is calculated for the new solution. The simulated annealing algorithm is reiterated until a global, rather than merely local, optimization is achieved. In the algorithms, each solution at each state is represented by a matrix whose orders equal the number of cameras to be placed and the five degrees of freedom of each camera (three coordinates of position and two coordinates of angular orientation). The mutation can also be used to optimize the number of cameras.

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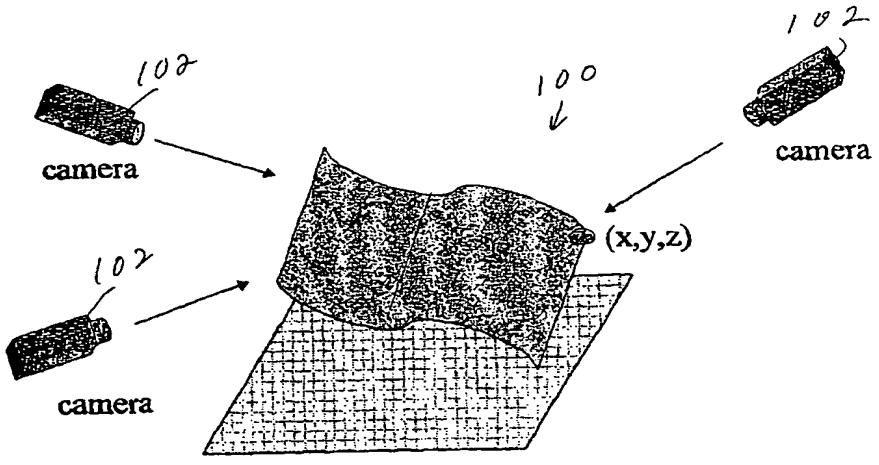

(57) Abstract: Optimizes the positions and angular orientations of cameras (102) used to cover a predetermined volume (100) such as a hall or sports field by combining a genetic algorithm and a simulated annealing algorithm. First, random initial solutions are generated and a local search is performed around each solution to find a local optimum solution. Then each local optimum solution is mutated randomly. The mutated solutions are combined and sorted by coverage level. The mutated solutions having the highest coverage levels are selected for simulated annealing. The simulated annealing algorithm generates a solution within a predetermined search radius of the mutated solution. A coverage level is calculated for the new solution. The simulated annealing algorithm repeats until global optimization is achieved. Each solution at each state is represented by a matrix whose orders equal the number of cameras (102) to be placed and the five degrees of freedom of each camera.

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